Claims

What is claimed is:

1. A machine for assembling a blower wheel, the blower wheel comprising a plurality of blower wheel components, wherein the blower wheel components comprise a ring, a cylindrical blade strip, a backplate, and a hub, the machine comprising:

a drive motor;

a first die having a first surface, whereon the blower wheel components reside, the first die rotatably coupled to the drive motor, wherein the drive motor is operable to rotate the first die about an axis;

a second die having a second surface oppositely disposed from the first surface of the first die, wherein the second surface is operable to engage one or more of the blower wheel components;

a transfer gear assembly rotatably coupled to the first die and the second die, wherein the transfer gear assembly is operable to generally transfer the rotation of the first die to the second die, thereby synchronizing the rotation of the first die and the second die;

a press coupled to the first die and the second die, wherein the second die is axially moveable with respect to the first die, and wherein the press is operable to compress the blower wheel components between the first die and the second die;

a first crimping member, wherein the first crimping member is radially moveable with respect to the first die, and wherein the first crimping member is operable to crimp a first flange on the ring onto a first end of the cylindrical blade strip when the press compresses the blower wheel components;

a second crimping member, wherein the second crimping member is radially moveable with respect to the second die, and wherein the second

crimping member is operable to crimp a second flange on the backplate onto a second end of the cylindrical blade strip when the press compresses the blower wheel components; and

a control system for controlling the drive motor, the press, the first crimping member, and the second crimping member.

2. The machine of claim 1, wherein the second die further comprises a deforming member axially coupled thereto, wherein the deforming member is operable to axially translate with respect to the second die during compression, therein generally deforming a circumference of the hub and coupling the hub to the backplate.

3. The machine of claim 1, wherein the control system is further operable to control the deforming member.

4. The machine of claim 2, wherein the press further comprises a first pressure stage and a second pressure stage, wherein the first pressure stage exerts a first compressive axial force on one or more of the blower wheel components, and the second pressure stage exerts a second compressive axial force on one or more of the blower wheel components which is different than the first compressive axial force.

5. The machine of claim 4, wherein the first compressive axial force is exerted on the ring, cylindrical blade strip, and backplate.

6. The machine of claim 4, wherein the second compressive axial force is exerted on the backplate and the hub.

7. The machine of claim 4, wherein the second compressive axial force is greater than the first compressive axial force.

8. The machine of claim 4, wherein the press comprises an air-over-oil pneumatic / hydraulic piston and cylinder assembly, wherein air pressure is utilized within the cylinder to exert the first compressive axial force, and wherein oil pressure is utilized within the cylinder to exert the second compressive axial force.

9. The machine of claim 8, further comprising one or more pressure switches, wherein each pressure switch is operable to transmit a signal to the controller when the oil pressure or air pressure reach a predetermined limit.

10. The machine of claim 2, further comprising one or more electro-pneumatic pressure regulators operable to control one or more of the first compressive axial force and the second compressive axial force.

11. The machine of claim 2, further comprising one or more pressure transducer, wherein each pressure transducer is operable to sense a pressure exerted on the blower wheel components from the first compressive axial force or the second compressive axial force.

12. The machine of claim 11, wherein the pressure transducer is electrically connected to the control system, and wherein the pressure transducer is operable to transmit the sensed pressure from the first compressive axial force or the second compressive axial force to the control system.

13. The machine of claim 1, further comprising a spring having a predetermined compliance, the spring coupled to the second die, wherein the spring generally permits a predetermined axial translation of the second die with respect to the press.

14. The machine of claim 1, wherein the first die and the second die accommodate a plurality of different hub dimensions.

15. A method of assembling a blower wheel, comprising the steps of:

placing a ring and a hub on a first die;

placing a cylindrical blade strip on the ring;

placing a backplate on the cylindrical blade strip, wherein the hub slidingly engages a hole in the backplate;

placing a second die on the backplate and hub;

applying a first compressive axial force to a second die, wherein the ring, cylindrical blade strip, and backplate are generally compressed between the first die and the second die;

applying a rotational force to the first die and the second die, wherein the first and second die are rotatably coupled by a transfer gear assembly;

applying a first radial crimping force on the ring, wherein a first flange of the ring engages a first portion of the cylindrical blade strip;

applying a second radial crimping force on the backplate, whereby a second flange of the backplate engages a second portion of the cylindrical blade strip;

generally stopping the rotation of the first and second die;

applying a second compressive axial force on the second die without removing the first compressive axial force, wherein the hub is generally deformed on one end, thereby engaging the backplate.

16. The method of claim 15, further comprising the step of measuring a number of rotations of the first die or the second die.

17. The method of claim 15, further comprising the step of measuring the first compressive axial force by a pressure transducer, thereby defining a first measured pressure.

18. The method of claim 17, further comprising the step of maintaining the first measured pressure below a first predetermined pressure by adjusting the first compressive axial force.

19. The method of claim 15, further comprising the step of measuring the second compressive axial force by a pressure transducer while the second compressive axial force is applied, thereby defining a second measured pressure.

20. The method of claim 19, further comprising the step of determining whether the second measured pressure is below a second predetermined pressure, and producing a signal indicating a fault if the second measured pressure is below the second predetermined pressure.

21. The method of claim 15, wherein the hub comprises a plurality of lugs which are generally deformed by the second compressive axial force, thereby securing the hub to the backplate.

22. The method of claim 15, wherein the hub comprises a generally circular flange which is generally deformed by the second compressive axial force, thereby securing the hub to the backplate.